1. PURPOSE OF AND NEED FOR THE AGENCY ACTION

1.1 INTRODUCTION

This environmental impact statement (EIS) has been prepared by the U.S. Department of Energy (DOE), in compliance with the National Environmental Policy Act of 1969 (NEPA) as amended (42 USC 4321 *et seq.*), to evaluate the potential environmental impacts associated with constructing and operating a project proposed by JEA (formerly the Jacksonville Electric Authority). The project has been selected by DOE to demonstrate circulating fluidized bed (CFB) combustion technology under the Clean Coal Technology (CCT) Program. The EIS will be used by DOE in making a decision on whether or not to provide cost-shared funding to design, construct, and demonstrate the CFB technology proposed by JEA, the largest public power utility in Florida, at their existing Northside Generating Station in Jacksonville, Florida.

"Clean coal technologies" refer to a new generation of advanced coal utilization technologies that are environmentally cleaner and, in many cases, more efficient and less costly than conventional coal-using processes. These technologies contribute to a major objective of the national energy strategy to reduce U.S. dependence on potentially unreliable energy suppliers. Because the abundant domestic reserves of coal make it one of the nation's most important resources for sustaining a secure energy future, DOE has pursued a research and development (R&D) program that has included increasing the use of coal while improving environmental quality. However, technologies that display potential at the proof-of-concept scale in an R&D program must be demonstrated at a larger scale before they are ready for commercialization. The CCT Program provides that essential step over the threshold between R&D and commercial application of these technologies. The program takes the most promising technologies and moves them into the commercial marketplace through demonstration. Successful demonstrations also help position the United States to supply clean coal technologies, including CFB combustion, to a rapidly expanding world market for advanced coal-fired combustion and pollution control technologies.

The CCT Program relies on substantial funding from sources other than the federal government, specifically, funds provided by the project participant (e.g., JEA for this proposed project). Pub. L. 99-190, the Department of the Interior and Related Agencies Appropriations Act of 1986, introduced and defined cost sharing for the program. In addition, the U.S. Congress directed that projects in the CCT Program should be industry projects assisted by the government and not government-directed demonstrations.

In the CCT Program, the project participant (i.e., the non-federal-government participant) must finance at least 50% of the total cost of the project. The government assists the project participant by sharing in the project's cost, as detailed in a cooperative agreement negotiated between the project participant and DOE. The government also shares in the rewards of successful projects. The participant must agree to repay the government's financial contribution to ensure that taxpayers benefit

from a successful project. The basis of the repayment is negotiated between the participant (or the technology provider) and the government.

The participant takes primary responsibility for designing, constructing, and demonstrating the project. During project execution, the government oversees project activities, provides technical advice, assesses progress by periodically reviewing project performance with the participant, and participates in decision making at major project junctures. In this manner, the government ensures that schedules are maintained, costs are controlled, project objectives are met, and the government's funds are repaid according to the terms in the cooperative agreements.

The CCT Program has committed funds to approximately 40 demonstration projects through 5 competitive solicitations. These solicitations have resulted in a combined commitment by the federal government and the project participants of about $6.9 billion. DOE's cost share for these projects is roughly $2.4 billion, or about 35% of the total. The project participants are providing the remaining $4.5 billion, or approximately 65% of the total estimated cost, which exceeds their 50% minimum share mandated by Congress.

Technologies may be demonstrated at either new or existing facilities, but must be capable of repowering or retrofitting existing facilities. By definition, repowering technologies replace a major portion of an existing facility, not only to achieve a substantial emissions reduction, but also to increase facility capacity, extend facility life, and improve system efficiency. Repowering can increase capacity from 10 to 150% and may be more cost-effective than retiring older units and replacing them with new plants. It also offers the opportunity to efficiently and reliably integrate emissions control and power generation technologies. Repowering technologies include CFB combustion, pressurized fluidized bed combustion, and integrated gasification combined cycle.

By definition, retrofit technologies reduce sulfur dioxide (SO_2) and/or oxides of nitrogen (NO_x) emissions by modifying components of existing facilities or their present feedstocks. Retrofit technologies include advanced coal cleaning, advanced flue gas cleanup, coal liquefaction, and coal gasification.

In December 1985, Congress made funds available to DOE for conducting the first round of the CCT Program. Congress directed that this first solicitation (1) be open to all market applications of clean coal technologies, (2) apply to any segment of the U.S. coal resource base, and (3) apply to both new and existing facilities. On February 17, 1986, DOE issued a Program Opportunity Notice soliciting proposals to conduct cost-shared projects to demonstrate innovative, energy efficient, and economically competitive technologies. In response to the solicitation, 51 proposals were received and 9 projects were selected by DOE in July 1986 for negotiation. In addition, a list of alternate candidates was established from which replacement selection could be made should any of the original selections not proceed. JEA's proposed CFB combustor project has evolved through a series of site changes from a project that was selected by DOE in November 1990 from the alternate list for demonstration.

1.2 PROPOSED ACTION

The proposed action is for DOE to provide support through cost-shared funding for the design, construction, and demonstration of CFB combustion technology for electric power generation at a size sufficient to allow utilities to make decisions regarding commercialization of the technology. Specifically, DOE will decide on providing approximately $75 million (about 24% of the total cost of approximately $309 million) to demonstrate CFB technology at JEA's Northside Generating Station in Jacksonville, Florida. The new CFB combustor would use coal and petroleum coke to generate nearly 300 MW* of electricity by repowering the existing Unit 2 steam turbine, a 297.5-MW unit that has been out of service since 1983. The project is expected to provide JEA with a low-cost, efficient, and environmentally sound source of additional electric generating capacity.

In addition, JEA plans to repower the currently operating Unit 1 steam turbine without cost-shared funding from DOE. The Unit 1 steam turbine would be essentially identical to the turbine for Unit 2 and would be repowered about 6 to 12 months after the Unit 2 repowering. Although the proposed project consists of only the Unit 2 repowering (because DOE would provide no funding for the Unit 1 repowering), this EIS evaluates the Unit 1 repowering as a related action (Section 2.2).

JEA, the project participant, plans to enter into a contract with Foster Wheeler Corporation, who would perform the design, engineering, procurement, and construction of the CFB combustor and air emissions control equipment. In addition, Black & Veatch would provide the design and engineering for the solid fuel and limestone handling system, ash silos, ash storage area, site drainage areas, chemical waste treatment facility, and refurbishment and upgrades of existing equipment in the turbine building. Fluor Daniel would perform the procurement and construction for the solid fuel and limestone handling system and labor for the refurbishment of the existing steam turbine and generator. HB Zachry would perform the procurement and construction associated with remaining activities such as the ash silos, tanks, pumps, equipment refurbishment in the turbine building, and construction-related laydown, assembly of site-fabricated components, and facilities to be used by the construction workforce.

JEA and Foster Wheeler conceived and proposed the technology in response to the DOE solicitation; DOE's role is limited to providing the cost-shared funding for the proposed project and, therefore, DOE's decision is whether or not to fund the project. DOE's limited involvement influences the alternatives considered in the EIS (Section 2), and DOE will make its decision based on those alternatives.

1.3 PURPOSE

The Clean Air Act (CAA) mandates that new and existing coal-fired power plants meet stringent emission levels. One of the goals of the CCT Program is to demonstrate promising coal utilization technologies that would not only help the power industry achieve mandated emission levels but would

*All electrical generating capacities presented in this EIS are gross rather than net; thus, the capacities include both the electricity used by consumers and the electricity consumed by the facilities themselves during operation.

also result in plants operating even more cleanly than required by the CAA. As part of this goal, the proposed project was selected by DOE to demonstrate the combined removal of SO_2, NO_x, and particulate matter using CFB combustion technology, with the objective of achieving emission levels lower than CAA limits while at the same time producing power more efficiently and at less cost than conventional coal utilization technologies.

Fluidized bed combustors possess several advantages over conventional combustors. A CFB combustor can burn a wider variety of fossil fuels, especially low-quality fuels that contain high volumes of moisture and/or ash. Limestone in the bed removes SO_2, thus eliminating the requirement for large, expensive scrubbers for SO_2 emissions control. Because CFB technology operates at lower temperatures than conventional boilers, NO_x production is reduced. DOE expects the project to demonstrate that CFB technology has high potential for use in repowering existing plants and in new facilities in both the industrial and utility sectors.

The purpose of the proposed project is to generate technical, environmental, and financial data from the design, construction, and operation of facilities at a scale large enough to allow the power industry to assess the potential of CFB combustion technology for commercial application. Although there are many small, mostly industrial CFB combustors in the United States, CFB combustors on a scale of 200 MW and larger are not yet accepted as commercial technology in the utility market. As indicated in Table 1.3.1, the size of the largest CFB combustor currently operating in the United States is 150 MW and in the world is 250 MW (Charles and Rezaiyan 1997). However, the conventional pulverized-coal boilers used today by electric utilities are predominantly units in the range of 250 to 400 MW. Electric utilities traditionally have installed these large units and will continue this practice to minimize the capital and operating costs of generating electricity (Charles and Rezaiyan 1997). A single large unit has economies of scale because it can be designed, constructed, and operated more cost effectively than two or more smaller units with the same total capacity. Factors contributing to the lower capital cost of a single large unit compared with multiple smaller units include reduced requirements for land, labor, and construction materials (e.g., concrete, structural steel, and piping). Factors contributing to the lower operating cost of a single large unit include reduced requirements for labor and auxiliary power. The proposed 300-MW project would take the next step in size by evaluating the viability of CFB combustion technology within the range that is most desired by utilities (250 to 400 MW).

1.4 NEED

The need for the proposed CFB combustor project is twofold. First, cost-shared funding for the project addresses the Congressional mandate in Pub. L. 99-190 for demonstrating environmentally sound technologies for the utilization of coal. Second, the project provides electricity for JEA's service area, thereby satisfying their future need for additional generating capacity. Although DOE recognizes that the need may be justified on either basis, its reason for selecting the proposed project

Table 1.3.1. Chronological list of existing and planned circulating fluidized bed combustors within and outside the United States with an electrical generating capacity of at least 150 MW

Location	Unit size (MW)	Number of units	Total capacity (MW)	Fuel	Start-up date
			United States		
Robertson Co., Texas	150	2	300	Lignite	1990
Taunton, Massachusetts	150	1	150	Coal	1998
Cumberland, Maryland	210	1	210	Bituminous coal	1999
Jacksonville, Florida	297.5	2	595	Bituminous coal, petroleum coke	2002
			Outside of the United States		
Orebro, Sweden	165	1	165	Coal	1990
Point Aconi, Canada	165	1	165	Coal	1994
Grenoble, France	250	1	250	Coal	1996
Turow, Poland	235	2	470	Brown coal, lignite	1998
Tonghae, Korea	220	1	220	Anthracite	1998
Tonghae, Korea	220	1	220	Anthracite	1999
Guyama, Puerto Rico	250	2	500	Bituminous coal	2000

Source: Charles and Rezaiyan 1997.

is to support the demonstration of innovative, coal-based technology, not for power production or meeting demands for electricity. The cost-shared contribution by DOE for the demonstration would help reduce the risk to the JEA team in developing CFB technology to the level of maturity needed for decisions on commercialization.

1.4.1 DOE's Need

Since the early 1970s, DOE and its predecessor organizations have pursued a broadly based coal R&D program for ensuring available and affordable energy supplies while improving environmental quality. This R&D program includes long-term activities that support the development of innovative, unproven concepts for a wide variety of coal technologies through the proof-of-concept stage. However, the availability of a technology at the proof-of-concept stage is not sufficient to ensure its

continued development and subsequent commercialization. Before any technology can be seriously considered for commercialization, it must be demonstrated at a sufficiently large scale. Utilities generally are reluctant to demonstrate technologies at an unproven scale by themselves in the absence of strong economic incentives or legal requirements. The implementation of a technology demonstration program with cost-shared funding from the federal government has been endorsed by Congress and industry as a mechanism to accelerate the commercialization of innovative technology to meet near-term energy and environmental goals, to reduce risk to an acceptable level through cost-shared funding, and to provide the incentives necessary for continued R&D directed at providing solutions to long-range energy supply problems.

The CCT Program includes a suite of technologies at varying levels of maturity. Because CFB technology is more mature than some of the others being demonstrated under the CCT Program, it tends to have a lower level of technological risk. The percentage of DOE funding provided for cost sharing is often used as a measure of the level of technological risk. The relatively small percentage (24%) to be provided by DOE for the proposed project is indicative of the technology's relatively low risk.

The primary goal of the CCT Program, as funded by Congress in 1985, is to make available to the U.S. energy marketplace a number of advanced, more efficient, economically advantageous, and environmentally responsive technologies for coal utilization. The CCT Program also addresses related energy issues including (1) long-range demand for additional electricity, (2) need for energy security, and (3) increased competitiveness in the international marketplace. The proposed CFB combustor project was selected for demonstration in the CCT Program as one of the projects that would best further the goals of the program.

Nearly 50% of current electrical generating capacity in the United States is over 30 years old. Thus, much replacement or refurbishment of aging facilities is anticipated over the next several decades to continue to meet current electricity demand, and new capacity will be needed to keep pace with rising demand for electricity. Currently, about 55% of U.S. electricity requirements are met by power plants fired with pulverized coal. As the most abundant domestic energy source, coal continues to represent an attractive option for future power plants, particularly through advanced technologies that have the potential to dramatically improve environmental performance and efficiency. The abundance of U.S. coal reserves makes it one of the nation's most important strategic resources for minimizing dependence on imported oil and sustaining a secure energy future. Using existing mining technology, recoverable reserves of coal in the United States could supply coal consumption at current levels for nearly 300 years. However, advanced coal utilization technologies such as those in the CCT Program must be successfully demonstrated if coal is to provide an environmentally acceptable and economically competitive source of energy into the 21st century.

As part of the CCT Program, the proposed project would meet DOE's need to demonstrate the commercial viability of using utility-scale CFB technology to generate electric power. The ability to show prospective domestic and overseas customers an operating facility rather than a conceptual or

engineering prototype is expected to be a persuasive inducement to purchase American coal utilization technology. Data obtained on operational characteristics using a variety of coal sources during the demonstration would allow prospective customers to assess the potential of CFB technology for commercial application. Successful demonstration of CFB technology enhances prospects of exporting the technology to other nations and may provide the single most important advantage that the United States could have in the global competition for new markets. DOE is working closely with JEA and Foster Wheeler to develop plans for technology transfer and commercialization to help further the CFB technology and accelerate its commercialization.

1.4.2 JEA's Need

Following the recommendations of the Energy Policy Act of 1992, JEA adopted the use of the integrated resource planning (IRP) process for determining its future need for additional electric generating capacity. This technique takes into consideration the full range of alternatives available, including building new facilities, upgrading technology at existing facilities, improving efficiency at existing facilities, purchasing power from other utilities, using renewable energy resources to generate electricity, conserving energy to reduce the demand for electricity, and building cogeneration facilities (facilities that simultaneously provide steam to industrial users and generate electricity). For JEA's service area, the 1996 IRP analysis (JEA 1996a) indicated an annual growth in electrical demand of more than 3% and an annual growth in peak demand of over 4.5%. JEA currently employs demand-side management to minimize annual growth by encouraging consumers to practice conservation and to reduce use during periods of peak demand. This effort includes three residential programs, one commercial/industrial program, and several educational programs.

The 1996 IRP analysis indicated—and the 1997 IRP update (JEA 1997a) confirmed—that new power supply resources would be needed by 1999. About 135 MW would be needed in 1999, with an increasing need of approximately 115 MW per year through 2007. This requirement for additional generating capacity is based on both the projected growth in electrical demand and plans by JEA to retire or shut down three oil- and gas-fired units with a history of equipment failure because of their age. The IRP study included detailed modeling of electrical demand on the JEA system, forecasts of fuel prices and availability, assessments of environmental factors, and evaluation of numerous facility construction and power purchase options. Screening analysis of over 60 alternatives led to a more detailed analysis of 12 alternatives involving construction and operation of electrical generating facilities and 6 alternatives involving power purchased from other utilities. An Electric Power Research Institute model called the Electric Generation Expansion Analysis System (EPRI 1996) was used to rank the alternatives according to cost. In addition to cost, environmental and land use considerations were factored into the resource plans to ensure that the least-cost plans selected by the model were socially and environmentally responsible. Based on all of these considerations, the most favorable plan to meet the future demand for electricity was the repowering of Units 1 and 2 at Northside Generating

Station, combined with other options (i.e., new combustion turbines at other sites and power purchased from other utilities). JEA has adopted this plan as their preferred approach to meet demand.

1.5 NATIONAL ENVIRONMENTAL POLICY ACT STRATEGY

This EIS has been prepared for use by DOE decision makers in determining whether or not to fund the design, construction, and demonstration of the CFB combustor project proposed by JEA under the CCT Program. The EIS evaluates the environmental impacts of a range of reasonable alternatives and provides a means for the public to participate in the NEPA process.

An overall strategy for compliance with NEPA was developed for the CCT Program, consistent with the Council on Environmental Quality (CEQ) NEPA regulations and DOE regulations for compliance with NEPA, that includes consideration of both programmatic and project-specific environmental impacts during and after the process of selecting a project. This strategy, called tiering (40 CFR Part 1508.28), refers to the coverage of general issues in a broader EIS (e.g., for the CCT Program), followed by more focused statements or environmental analyses that incorporate by reference the general issues and concentrate on those issues specific to the proposal under consideration. Tiering eliminates repetitive discussions and evaluations of the same issues and focuses on the actual issues ripe for decision at each level of environmental review.

The DOE strategy has three principal elements. The first element involved preparation of a comprehensive Programmatic EIS (PEIS) for the CCT Program, published in November 1989 (DOE 1989), to address the potential environmental consequences of widespread commercialization of each of 22 successfully demonstrated clean coal technologies in the year 2010. The PEIS evaluated (1) a no-action alternative, which assumed that the CCT Program was not continued and that conventional coal-fired technologies with flue gas desulfurization controls would continue to be used for new plants or as replacements for existing plants that are retired or refurbished, and (2) a proposed action, which assumed that CCT Program projects were selected for funding and that successfully demonstrated technologies undergo widespread commercialization by 2010.

The second element involved preparation of a preselection, project-specific environmental review of the proposed project based on project-specific environmental data and analyses that JEA supplied to DOE as part of the proposal. The review contained discussion of the site-specific environmental, health, safety, and socioeconomic issues associated with the project for use by DOE selection officials. The review analyzed the advantages and disadvantages of the proposed and alternative sites and/or processes reasonably available to JEA.

The third element consists of preparing site-specific NEPA documents for each selected project. DOE determined that providing cost-shared funding for the proposed CFB combustor project constitutes a major federal action that may significantly affect the quality of the human environment. Therefore, DOE has prepared this EIS to assess the potential impacts on the human and natural environment of the proposed action and reasonable alternatives. As part of the overall NEPA strategy

for the CCT Program, this EIS draws upon the PEIS and preselection environmental reviews that have already analyzed many alternatives and scenarios (e.g., alternative technologies and sites).

The Oak Ridge National Laboratory (ORNL) has assisted DOE in preparing this EIS and supporting documents for the proposed project. In independently assessing the issues and preparing the EIS, ORNL has utilized information provided by DOE; other federal, state, and local agencies; the JEA team; and others. DOE is responsible for the scope and content of the EIS and supporting documents and has provided direction to ORNL, as appropriate, in the preparation of these documents. The EIS has been prepared in accordance with Section 102(2)(C) of NEPA, as implemented under regulations promulgated by the CEQ (40 CFR Parts 1500-1508) and as provided in DOE regulations for compliance with NEPA (10 CFR Part 1021). The EIS is organized according to CEQ recommendations (40 CFR Part 1502.10).

A Notice of Intent to prepare the EIS and hold a public scoping meeting was published by DOE in the *Federal Register* on November 13, 1997 (62 *FR* 60889–92). The Notice of Intent invited comments and suggestions on the proposed scope of the EIS, including environmental issues and alternatives, and invited participation in the NEPA process. On November 24, 1997, an advertisement publicizing the public scoping meeting was printed in *The Times-Union* newspaper in Jacksonville, Florida, and the Notice of Intent was printed on November 26, 1997, in the "Legal Notices" section of the newspaper. The Notice of Intent and other information to announce the public scoping meeting were sent to 27 publications, radio stations, and television stations in Florida. Flyers announcing the meeting were distributed in the community. The Notice of Intent also was sent to stakeholders including federal, state, and local agencies, environmental groups, and a Native American tribal council for their information and comments on the proposed project.

Publication of the Notice of Intent initiated the EIS process with a public scoping period for soliciting public input to ensure that (1) significant issues are identified early and appropriately addressed, (2) issues of little significance do not consume time and effort, (3) the EIS is thorough and balanced, and (4) delays occasioned by an inadequate EIS are avoided (40 CFR Part 1501.7). DOE held the scoping meeting in Jacksonville, Florida, on December 3, 1997. The public was encouraged to provide oral comments at the scoping meeting and to submit additional comments in writing to DOE by the close of the EIS scoping period on December 31, 1997.

DOE received 3 oral responses and 20 written responses from members of the public, interested groups, and federal, state, and local officials. The responses assisted in establishing additional issues to be analyzed in the EIS and in determining the level of analysis required for each of the issues. Issues raised during public scoping are identified in Section 1.6.

1.6 SCOPE OF THE ENVIRONMENTAL IMPACT STATEMENT

This section summarizes the issues and alternatives associated with the proposed project that have been identified and considered by DOE and JEA. The following issues were initially identified as requiring analysis and assessment in the EIS and were included in the Notice of Intent:

1. Atmospheric Resources: potential air quality impacts resulting from air emissions during current and future operation of Northside Generating Station (e.g., effects of ground-level concentrations of criteria pollutants, and trace metals including mercury, on surrounding residential areas and the Timucuan Preserve (a National Park Service Class II ecological and historic preserve adjacent to the eastern edge of Northside Generating Station); potential effects of greenhouse gas emissions on global climate change;
2. Water Resources and Aquatic Ecology: potential effects on surface water and groundwater resources consumed and discharged; potential effects on estuarine salt marsh ecosystems and aquatic biota resulting from withdrawing and discharging cooling water from the St. Johns River (e.g., thermal discharge, entrainment or impingement of fish and invertebrate species);
3. Infrastructure and Land Use: potential effects resulting from the transport of coal, petroleum coke, and limestone required for the proposed project, including the development of land for infrastructure, storage, or waste disposal; affected resource areas including land (e.g., existing shoreline and wetlands), utilities, and transportation routes (e.g., train traffic to supply coal);
4. Solid Waste: pollution prevention and waste management practices, including solid waste impacts, caused by the generation, treatment, transport, storage, and disposal of solid wastes;
5. Construction: impacts associated with noise, traffic patterns, and construction-related emissions;
6. Aesthetics: impacts associated with a new stack that is taller than existing structures at Northside Generating Station;
7. Floodplains: potential impacts (e.g., impeding floodwaters, redirecting floodwaters, onsite and offsite property damage) of siting new buildings and infrastructure within floodplain and hurricane storm surge areas;
8. Wetlands: potential reduction of wetlands due to new construction (e.g., construction associated with infrastructure for receiving, conveying, and storing coal, petroleum coke, and limestone);
9. Community Impacts: impacts on public safety related to fire and emergency vehicle access to the Northside community of Jacksonville; impacts to local traffic patterns resulting from rail traffic; socioeconomic impacts on public services and infrastructure (e.g., police protection, schools, and utilities); noise associated with project operation; environmental justice with respect to the surrounding community; and
10. Cumulative Impacts: effects that result from the incremental impacts of the proposed project when added to other past, present, and reasonably foreseeable future actions (e.g., incremental discharge of cooling water affecting aquatic biota).

This list was developed partly on the basis of concerns identified by the public in response to an ongoing stakeholder outreach program conducted by JEA.

During the scoping process (Section 1.5), local residents and community organizations expressed concern about potential adverse effects that could be caused by the proposed project. The issue that probably has mobilized the largest number of people is the possible increase of train traffic in the vicinity of Northside Generating Station resulting from the need to transport coal to the plant. Currently, trains delivering coal to the St. Johns River Power Park use the same tracks that would be used by trains delivering coal for the proposed project.

At the public scoping meeting, a resident of a nearby neighborhood complained about past and continuing train traffic through the local area, specifically the communities of Panama Park, North Shore, and San Mateo (Figure 3.9.3). Stating that his concerns are shared by large numbers of his neighbors and documenting that assertion with reference to a recent petition drive, the speaker noted that large numbers of trains pass through the area at night (Section 3.9.1.2) and that these passages are routinely punctuated by high-decibel train whistles [which the speaker said he had measured at 108 dB(A) at his property line] and loud rattling of the cars themselves [up to 85 dB(A)] that disturb the sleep of nearby residents. In a follow-up letter, this speaker also asserted that train traffic through the local area has resulted in vibration-induced structural damage to residences, can block access by emergency vehicles and others because of extended delays at on-grade rail crossings (Section 3.9.1.1), and could result in property devaluation. Similar concerns were also expressed at previous meetings between JEA and community groups such as the Northside Civic Association and the local umbrella organization calling itself Economic Development and Enhancement of the Northside. If local residents perceive that train traffic through their neighborhoods increases after the proposed project begins operations and attribute this increase to project operations, the level of their concerns could increase.

Other concerns expressed at the scoping meeting and at previous meetings between JEA and community groups are the potential effect of the project on air quality, the possible degradation of wetlands, and potential impacts to manatees and their habitat. Adverse impacts to these resources could increase the level of community concern. However, as discussed in Sections 4.1.2, 4.1.5.3, and 4.1.6.3, significant adverse impacts to these resources are not expected.

DOE used public input obtained during the scoping process to add to the list of issues requiring analysis and assessment. As discussions about the project progressed, DOE identified several other issues to be addressed. Table 1.6.1 lists the composite set of issues identified for consideration in the EIS. Issues are analyzed and discussed in this EIS in accordance with their level of importance. The most detailed analyses focus on issues associated with train traffic and air quality impacts.

NEPA requires an EIS to include a discussion of reasonable alternatives to the proposed action. The purpose of and need for the proposed action determine the range of reasonable alternatives. Reasonable alternatives to the proposed CFB combustor project (i.e., approaches that are practical or feasible both technically and economically) that were considered initially as candidates for analysis in this EIS are identified and briefly described in the following bullets:

- ***No-action alternative***. DOE would not provide funding to demonstrate CFB combustion technology. In the absence of DOE funding, there are three options that JEA could reasonably pursue: (1) JEA could construct the proposed project without DOE cost-shared funding; (2) JEA could construct a new gas-fired combined cycle facility at Northside Generating Station or at another location; and (3) JEA could purchase electricity from other utilities to meet JEA's projected demand.

Table 1.6.1. Issues identified for consideration in the environmental impact statement

Issues identified in the Notice of Intent	
Atmospheric resources	Aesthetics
Water resources and aquatic ecology	Floodplains
Infrastructure and land use	Wetlands
Solid waste	Community impacts
Construction	Cumulative impacts
Additional issues identified during public scoping	
Noise and vibration-induced structural damage caused by rail traffic	
Hazardous air pollutants (e.g., sulfuric acid mist, fluorides, dioxins)	
Impacts to manatees and their habitat	
Further issues identified by the U.S. Department of Energy	
Cultural resources	
Electromagnetic fields	
Safety and health of workers and the public	
Compliance with all applicable federal, state, and local statutes and regulations	

- ***Alternative site***. The CFB combustion technology would be demonstrated at another site. During its site selection process, JEA considered additional sites (i.e., the sites of their existing power plants and a hypothetical undeveloped site). An existing plant site was preferred because the cost associated with construction of the project at an undeveloped site would be much higher, and the environmental impact likely would be much greater than at an existing facility.
- ***Alternative size***. The CFB combustion technology would be demonstrated using a larger- or smaller-sized combustor. This alternative would not meet DOE's purpose (see Section 1.3).
- ***Alternative technologies***. DOE would demonstrate other technologies. This alternative would not demonstrate CFB combustion technology and may not meet DOE's need to demonstrate advanced coal utilization technologies (see Section 1.4.1).

Of these alternatives, two were determined to require consideration in the EIS: the proposed project and the no-action alternative (including three reasonably foreseeable scenarios). Three alternatives were dismissed from further consideration: alternative site, alternative size, and alternative technologies. Alternatives and the basis for their consideration or dismissal are discussed in detail in Section 2.

1.7 APPROACHES AND ASSUMPTIONS

The following approaches are used and assumptions are made in this EIS:

- Potential environmental impacts are assessed for the surrounding environment (beyond the boundary of the facilities).
- Except as specifically noted in the text, potential environmental effects of the proposed project are based on the operating characteristics discussed in Section 2.
- One major exception to the above is that air quality impacts predicted by air dispersion modeling are based on the conservative assumption that the proposed facility operates at a 100% capacity factor rather than the expected 90% capacity factor.
- Potential environmental impacts of the proposed project during construction and operation during the demonstration period are assessed in Section 4. Section 5 addresses potential impacts of commercial operation following completion of the demonstration.